

<b>Notice of Allowability</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/821,404	EIDE, ELLEN M.	
	<b>Examiner</b>	<b>Art Unit</b>	
	James S. Wozniak	2626	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the supplemental amendment filed on 7/27/2007 and the telephone interview from 8/10/2007.
2. ☒ The allowed claim(s) is/are 2,5,6,8-12,14,17,18 and 20-25 (now claims 1-17).
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |   |  |
|---|--|
| <ol style="list-style-type: none"> <li>1. <input type="checkbox"/> Notice of References Cited (PTO-892)</li> <li>2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)</li> <li>3. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),<br/>Paper No./Mail Date _____</li> <li>4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br/>of Biological Material</li> </ol> | <ol style="list-style-type: none"> <li>5. <input type="checkbox"/> Notice of Informal Patent Application</li> <li>6. <input checked="" type="checkbox"/> Interview Summary (PTO-413),<br/>Paper No./Mail Date _____.</li> <li>7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment</li> <li>8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance</li> <li>9. <input type="checkbox"/> Other _____.</li> </ol> |
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## **DETAILED ACTION**

### ***Response to Amendment***

1. In response to the telephone interview from 7/19/2007, the applicant has submitted an amendment, filed 7/27/2007, amending the independent claims to incorporate the allowable subject matter of claim 8 and all intervening claims and further amending claim 25 to overcome the previous 35 U.S.C. 101 rejection (*Amendment, Pages 9-10*). In response to such amendments, the further examiner's amendment, and for the reasons below, claims 2, 5-6, 8-12, 14, 17-18, and 20-25 are allowable over the prior art of record.

### **EXAMINER'S AMENDMENT**

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Stanley Ference (*Reg. No. 33,879*) on 8/10/2007.

3. The application has been amended as follows:

Please amend claims 8 and 25 as follows:

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8. A method of facilitating speech recognition, said method comprising the steps of:

obtaining speech input data;

building a model for each feature of an original set of linguistic features, wherein the model reflects[[:]] whether or not each feature is present;

ranking the linguistic features,~~and~~;

rebuilding the model for each of a preselected number N of the ranked linguistic features;

and

compiling a confusion matrix for each feature of the original set of features subsequent to said step of building a model for each feature of an original set of features, wherein said

compiling a confusion matrix comprises:

computing a score for each feature based on the likelihood of its presence in a frame of the speech input data, and

calculating mutual information between truth and labels for each feature;

wherein the ranking comprises ranking the mutual information calculated in compiling the confusion matrix.

25. A program storage device readable by computer, tangibly embodying a program of instructions executable by the computer to perform method steps for speech recognition, said method comprising the steps of:

obtaining speech input data;

building a model for each feature of an original set of linguistic features, wherein the model reflects[[:]] whether or not each feature is present;

ranking the linguistic features,~~and;~~

rebuilding the model for each of a preselected number N of the ranked linguistic features;

and

compiling a confusion matrix for each feature of the original set of features subsequent to said step of building a model for each feature of an original set of features, wherein said compiling a confusion matrix comprises:

computing a score for each feature based on the likelihood of its presence in a frame of the speech input data, and

calculating mutual information between truth and labels for each feature;

wherein the ranking comprises ranking the mutual information calculated in compiling the confusion matrix.

***Allowable Subject Matter***

4. **Claims 2, 5-6, 8-12, 14, 17-18, and 20-25** are allowable over the prior art of record.

5. The following is an examiner's statement of reasons for allowance:

With respect to **Claims 8, 20, and 25**, the prior art of record fails to explicitly teach a

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method, system, and computer storage device storing a program for creating speech recognition models based on linguistic pronunciation features (*Specification, Page 7*) comprising: obtaining a speech input, building a model for a complete set of linguistic features that indicates whether or not each feature is present, compiling a confusion matrix for each feature by computing a score for each feature based on the likelihood of its presence in a frame of the speech input data and calculating mutual information between truth and labels for each feature (*Specification, Page 9*), ranking the linguistic features based on the mutual information in the confusion matrix (*Specification, Page 9*), and rebuilding a final speech recognition models based on the top-ranking features (*Specification, Pages 10-11*).

Although Kirchoff ("*Robust Speech Recognition Using Articulatory Information*," 1999) discloses a method/system for creating speech recognition models dependent upon articulatory (*linguistic*) features utilizing confusion matrix and mutual information analysis (*Section 3.2.3, Pages 48 and 50-53; and Section 4.1.2, Page 79*), Kirchoff does not explicitly teach or fairly suggest that linguistic features are ranked for rebuilding according to mutual information calculated between truth and labels for each linguistic feature in a confusion matrix, which is complied by computing a score for each feature based on the likelihood of its presence in a speech input frame, as is recited in independent claims 8, 20, and 25.

The dependent claims further limit allowable independent claims 8, 20, and 25, and thus also contain allowable subject matter by virtue of their dependency.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue

fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

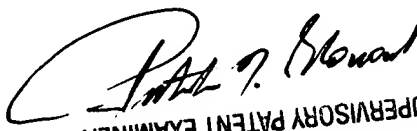
*Conclusion*

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James S. Wozniak whose telephone number is (571) 272-7632. The examiner can normally be reached on M-Th, 7:30-5:00, F, 7:30-4, Off Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Edouard can be reached at (571) 272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

James S. Wozniak  
8/21/2007

  
PATRICK N. EDUARD  
SUPERVISORY PATENT EXAMINER